

**WHAT IS CLAIMED IS:**

- 50,01
1. A method for analyzing the capacity of an application executing on a parallel processing system and expressed as a graph of vertices, comprising the steps of:
    - (a) creating a description of the sizes of data records throughout the graph;
    - (b) creating a performance description of each vertex in the graph;
    - (c) determining an execution time for each vertex in the graph;
    - (d) determining counts of data records assigned to corresponding vertices in the graph; and
    - (e) creating a description of the total execution time and performance of the system based on the determined execution time and counts of data records.
  2. The method of claim 1 further comprising the steps of:
    - (a) creating multiple descriptions of the total execution time and performance of the system based on multiple input data sets; and
    - (b) creating a comparison of the multiple descriptions.

1 3. A method for analyzing the capacity of an application executing on a parallel processing  
2 system and expressed as a graph of vertices and links given a set of supplied values,  
3 comprising the steps of:

- 4 (a) creating a description of the vertices and links of the graph including connections  
5 between vertices and links, data processing rates, and amounts of data;  
6 (b) generating performance characteristics of the application based upon the  
7 description, and the set of supplied values, including total execution time,  
8 resource requirements, and capacity of the application;  
9 (c) providing a means such that the supplied values can be altered, creating altered  
10 values; and  
11 (d) re-generating performance characteristics of the application based on the altered  
12 values.

1 4. The method of claim 3 further comprising the steps of:

- 2 (a) accepting multiple sets of supplied values;  
3 (b) generating performance characteristics of the application for each set of supplied  
4 values;  
5 (c) calculating sets of estimated values by applying trend equations to the multiple  
6 sets of supplied values;  
7 (d) generating performance characteristics of the application based on the estimated  
8 values; and  
9 (e) displaying the performance characteristics based on each set of supplied values  
10 and based on the estimated values.

1 5. A method for analyzing the capacity of an application executing on a parallel processing  
2 system and expressed as a graph of vertices and links given a set of supplied values,  
3 comprising the steps of:

- 4 (a) creating a description of the vertices and links of the graph including connections  
5 between vertices and links, data processing rates, and amounts of data;  
6 (b) generating performance equations based upon the description which will calculate  
7 performance characteristics of the system including total execution time, resource  
8 requirements, and capacity of the application;  
9 (c) applying the performance equations to the supplied values;  
10 (d) providing a means such that the supplied values can be altered, creating altered  
11 values; and  
12 (e) applying the performance equations to the altered values.

1 6. The method of claim 5 further comprising the steps of:

- 2 (a) accepting multiple sets of supplied values;  
3 (b) applying the performance equations to each set of supplied values;  
4 (c) generating trend equations based upon the multiple sets of supplied values;  
5 (d) calculating sets of estimated values by applying the trend equations to the  
6 multiple sets of supplied values;  
7 (e) applying the performance equations to the estimated values.; and  
8 (f) providing a means of displaying the supplied values, the estimated values, and  
9 stored results.

1 7. A computer program for analyzing the capacity of an application executing on a parallel  
2 processing system and expressed as a graph of vertices and links given a set of supplied  
3 values, the computer program being stored on a media readable by a computer system,  
4 for configuring the computer system upon being read and executed by the computer  
5 system to perform the functions of:

- 6 (a) creating a description of the vertices and links of the graph including connections  
7 between vertices and links, data processing rates, and amounts of data;  
8 (b) generating performance characteristics of the application based upon the  
9 description, and the set of supplied values, including total execution time,  
10 resource requirements, and capacity of the application;  
11 (c) providing a means such that the supplied values can be altered, creating altered  
12 values; and  
13 (d) re-generating performance characteristics of the application based on the altered  
14 values.

1 8. The computer program of claim 7 further comprising the functions of:

- 2 (a) accepting multiple sets of supplied values;  
3 (b) generating performance characteristics of the application for each set of supplied  
4 values;  
5 (c) calculating sets of estimated values by applying trend equations to the multiple  
6 sets of supplied values;  
7 (d) generating performance characteristics of the application based on the estimated  
8 values; and  
9 (e) displaying the performance characteristics based on each set of supplied values  
10 and based on the estimated values.

1 9. A computer-readable storage medium, configured with a computer program for analyzing  
2 the capacity of an application executing on a parallel processing system and expressed as  
3 a graph of vertices and links given a set of supplied values, where the storage medium so  
4 configured causes a computer to operate in a specific and predefined manner to perform  
5 the functions of:

- 6 (a) creating a description of the vertices and links of the graph including connections  
7 between vertices and links, data processing rates, and amounts of data;  
8 (b) generating performance characteristics of the application based upon the  
9 description, and the set of supplied values, including total execution time,  
10 resource requirements, and capacity of the application;  
11 (c) providing a means such that the supplied values can be altered, creating altered  
12 values; and  
13 (d) re-generating performance characteristics of the application based on the altered  
14 values.

1 10. The computer-readable storage medium of claim 9 further comprising the functions of:

- 2 (a) accepting multiple sets of supplied values;  
3 (b) generating performance characteristics of the application for each set of supplied  
4 values;  
5 (c) calculating sets of estimated values by applying trend equations to the multiple  
6 sets of supplied values;  
7 (d) generating performance characteristics of the application based on the estimated  
8 values; and  
9 (e) displaying the performance characteristics based on each set of supplied values  
10 and based on the estimated values.

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